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MANUFACTURES.

Manufactures in the Federal Census.

The statistics of manufactures are among the weakest in the whole range of census reports, although more carefully compiled than most. They are subject to more limitations, and are susceptible of more misleading interpretations than any other group. As a statistical photograph of facts, they are inadequate and defective, though perhaps not more so than other branches of census work.

This is the more to be regretted because of the intimate relation which the manufacturing statistics bear, or are supposed to bear, to modern sociological study. In the series of problems which increasingly occupy public attention,—those which have to do with the relations of labor and capital and the contention of individualism *vs.* collectivism,—these statistics are incessantly drawn upon to enforce the argument of one side or the other. Such is their construction that either side can prove from them, or thinks it can prove, practically any proposition it chooses to advance.

Thus our manufacturing statistics are reservoirs of popular error. Without a full understanding of their limitations, it is impossible to avoid falling into misconception. Notwithstanding the frequent sign-posts and danger-signals scattered through the text, economists, public writers, legislators, and propagandists of every sort persist in reading them awry; and we may assume that most of them are honest in so doing.

It is necessary to add that some compilers of manufacturing statistics set the fashion by reading into them,

through derivative tables and percentages, certain relationships which the methods of compilation do not warrant. Any subsidiary calculation which contains an element of error—not an error in original data or computation, but an error in principle—is one that ought never to be made in an official census.

Some of the limitations upon the value of manufacturing statistics can be remedied, in a degree at least, and some of them at present appear to be hopeless.

Two things may encourage us in spite of this outlook. One is the fact that, defective as they are, our manufacturing statistics are the best produced in any country; the other is the fact that since 1860 they have steadily improved from decade to decade.

The difficulties surrounding a complete census of manufactures are so appalling that they have thus far deterred any of the great manufacturing nations of Europe from attempting the work on any comprehensive scale like our own. These difficulties have never in the least degree phased or made to falter the ambitious statisticians of our own country; and manufacturing statistics have so multiplied of late years, through the compilations of our increasing number of state bureaus of labor statistics, that it appears timely to study their methods and limitations, to point out some of their defects, and to measure their intrinsic value as guides to definite conclusions in practical affairs, in legislation and in social movement.

I. THE EARLIER CENSUSES OF MANUFACTURES.

The industrial census of the nation was first undertaken in 1810, on the recommendation of Secretary Gallatin in his Report on Manufactures. Congress had no conception of the difficulties of the task it ordained.

This first industrial census was taken without even the formality of a schedule, or definite instructions to the marshals, and necessarily it forms no true measure of the industrial resources of the country at that time. Whatever utility the figures possess was imparted by Tench Coxe, who was appointed by the Secretary of the Treasury to digest the returns and make out of them such showing as he could.

Of the \$198,613,471 reported as the value of products, more than 60 per cent was estimated by Mr. Coxe. While the statistical value of such an estimate is doubtful, it does nevertheless afford a definite starting-point, undoubtedly conservative, from which our subsequent growth can be approximately measured, precisely as the growth of English wealth and resources is measured from Domesday Book.

The industrial census of 1820, although conducted on a schedule which contained the principal questions of present inquiry, was even more unsatisfactory than that of 1810, partly, according to Mr. Bishop,¹ "on account of the inadequate compensation allowed the enumerators, and partly from the inability or reluctance of manufacturers to give details of their business." The digest of the returns prepared in the office of the Secretary of State was so imperfect an exhibit that the Secretary was only constrained to permit its publication by the imperative nature of the resolution of Congress calling for it. A subsequent resolution providing for its distribution was tabled. On this account the document has come to possess some value to bibliophiles as a rare bit of Americana, but it has none to the statistician.

The value of manufactured articles returned was

¹ J. Leander Bishop, "A History of American Manufactures," 3 : 263. (1868.)

\$32,271,984, just about one-sixth of the product reported ten years earlier. The decrease, Mr. Bishop explains, was in part due to "the omission of all manufactures strictly domestic or household." Another explanation was the failure to secure the services of a man like Tench Coxe, capable of reading into the figures some of the data which the enumerators left out.

This experience led to the abandonment of any attempt to take an industrial census in 1830.

The census of 1840 was little better than its predecessors. "We are astonished as well as embarrassed," says Mr. Bishop, "by the meagerness of its details. Even of the leading branches in some instances only the capital is given; in others only the product; and we confess we do not know by what rule of arithmetic or mensuration any one could have calculated from official data that the capital invested in manufactures at that time was \$267,726,579." The report itself does not attempt to aggregate the value of the products returned; in a number of the leading industries, such as flour and grist mills, cast iron, liquors, powder, etc., only the quantities are returned; when we come to cast up the account for ourselves, making our own estimates, we find the aggregate so relatively small that we suspect it affords the explanation of the absence of any attempt at an official total.

General Walker declares that the results of the manufacturing census of 1840 are "worthy of little consideration;" and he adds that it is "from the census of 1850 that official information on this subject may be said to begin."¹ Mr. Bishop also declares that the seventh census, which was taken under the direction of J. D. B. DeBow, was the first in which "the government attempted to ascertain with an approach to accuracy the

¹ *Encyclopædia Britannica*, article "United States," 824,f.

exact development of the productive industry of the country, not counting any establishments that did not produce \$500 per year." "The astounding fact was revealed," adds Bishop, "that the capital invested in manufactures exceeded \$550,000,000, and the annual product had reached \$1,019,106,616."

The census of 1860, which reported products of the value of \$1,885,861,676, adds "a moderate estimate for omissions and for non-return of minor and inconsiderable establishments," which brings the total up to \$2,000,000,000, or an increase of \$980,894,000 in ten years.

The census of 1870 was taken under the law of 1850, and Superintendent Walker was not long in discovering that the original returns were so defective as to be in the nature of a burlesque upon accuracy. The result was a re-enumeration of five of the chief cities and of many smaller ones, which added \$250,000,000 to the gross product originally reported. He then balanced accounts between the eighth and ninth censuses, adding or subtracting the industries covered in one and not the other, in the following manner:¹

Total production of the United States, 1870, as reported	\$4,232,325,442
Add on account of cotton-ginning, etc. (omitted)	\$65,753,323
Mining, pure, "-----	82,016,061
Quarrying, "-----	11,860,622
Fisheries, "-----	11,096,522
	<hr/>
	170,726,528
	<hr/>
	\$4,403,051,970
Deduct on account of butchering-----	\$13,686,061
Value of cloth printed-----	36,838,007
Increase in reported production of carpenters, coopers, etc.-----	177,569,242
Increase due to re-enumeration-----	250,000,000
	<hr/>
	478,093,310
	<hr/>
	\$3,924,958,660
Total production of the United States, 1860, as published-----	1,885,861,676
	<hr/>
Increase in 10 years, 108.12 per cent-----	\$2,039,096,984

¹ Ninth Census, *Wealth and Industry*, 378, f.

I reproduce this table for the purpose of illustrating how enormous is the variation, from census to census, in the basis or sub-structure of the manufacturing statistics, and now dangerous it is to attempt any such tables of comparative increase, or percentage of increase, as that which appears in the volume on Manufactures for 1890.¹ The fact is that there have never yet been two censuses of manufactures taken which are properly comparable by the percentage method, either as a whole or in any of their elements.

General Walker, further commenting upon the manufacturing statistics of the census of 1870,² said :

“If the reported gross product, \$1,885,861,676, at 1860, had been correct (as it manifestly was not), about 3,925 millions of dollars would have been the true expression for the gross product of 1870. On the other hand were the reported gross product of 1870, \$4,232,325,442, correct (and it is manifestly below the facts of the case), about 2,030 millions of dollars would have been a just statement of the product of 1860. If, again, the product of 1870 were to be increased (as it clearly ought) by a sum exceeding \$600,000,000 on account of the omissions and deficiencies which have been previously noted, the product of 1860 would stand at about 2,325 millions of dollars, while the product of 1870 reached \$4,839,090,670.”

These curious computations and readjustments show how little intrinsic value, for scientific statistical purposes, has been assigned to the totals of the census of manufactures, by those who are familiar with them from the inside.

The greatest step in advance was at the census of

¹ Eleventh Census, Manufacturing Industries, 1 : 4.

² Ninth Census, *Ibid.*

1880, when the modern method of enumeration and supervision was first employed, and General Walker applied the system of special agents, first in the collection of data, and then in their presentation by industries under the supervision of experts. The reports of this census are consequently the first, in the substantial accuracy of which we can have much confidence. Both these improvements were continued and perfected under the census of 1890. It is difficult to understand the grounds upon which Congress now proposes to deprive the census director of the advisory services of experts, in the preparation, compilation and interpretation of the statistics of the great industries. It is certain that this work cannot be satisfactorily performed by the average census clerk, having no knowledge of the technical significance and the logical relation of the figures with which he is dealing. It is certain that the Census Office cannot command, for the salary of clerks, capable experts willing to surrender permanent vocations for temporary service. That there have been abuses of the special agency system is known to us all; but it would seem to be an easy matter so to guard a provision of law authorizing them as to protect both the service and the director.

The chief improvements of the census of 1890 over that of 1880 were the addition of the item of miscellaneous expenses, previously strangely overlooked, the classification of wage returns, and the further differentiation of the great manufacturing industries by the use of special schedules. There is, however, a limit to the extent to which this specialization of industries can be carried, for the danger of overloading is always present.

The eleventh census was also a vast improvement over all its predecessors, in the system and intelligence with

which the schedules were classified, revised, tabulated and verified.

This brief reference to previous censuses of manufactures conveys some idea of the difficulties in the way of their collection and compilation, and of the reasons why comparisons between their several results must be made with many reservations, where it is permissible to make them at all. Inadequate provision and insufficient compensation for the collection of original data have been accompanied by other difficulties more serious—the reluctance of men to reveal the details of their private business into which they feel the government has no right to pry, the natural disposition to suppress or color the facts, and the fear on the part of many that data of this character are sought for some purpose that has to do with taxation. On top of all this is the difficulty of so framing a schedule that the manufacturer, however intelligent and well disposed, will make a return which will dovetail with itself. In gathering the statistics of the wool manufacture for the eleventh census, four out of every five schedules received had to be returned for important corrections; nor was this experience peculiar to that industry. The carelessness of the enumerator, coupled with the carelessness or covert hostility of the manufacturer,—who is apt to regard these statistics with contempt where he does not look upon them with dread,—combine to make the returns less trustworthy, and more difficult to whip into shape, than those of any other branch of the census. These are difficulties that interfere with the collection of the data; those that interfere in their compilation are more serious still.

II. THE DEFECTIVE STANDARD OF MEASUREMENT.

In an inquiry into the nature of these difficulties, we are confronted on the threshold with the impossibility of applying any uniform standard of measurement to the results of the enumeration. In treating of industry as a whole, the census is confined to value as the only available standard of measurement, quantities being out of the case. When we undertake to ascertain an average death rate, we have something definite and tangible to work for; something which means the same thing under all conditions, and the variations of which always tell their story in the same way. The standard of measurement by value is variable and untrustworthy in two ways. We have first the variation in the standard by which value itself is measured. Thus the census of 1860 was taken on the gold basis of value; the census of 1870 was taken when the paper dollar had an average value in gold of 79.81 cents; the census of 1880 was taken on the heels of the resumption of specie payments by the government; and the census of 1890 on a normal monetary basis. The standard by which we measure the volume of our manufacturing products has been essentially different at each of the last four censuses.

The census of 1890 has attempted to make the figures comparable, by reducing the value reported for 1870 to a gold basis,¹ thus reducing a product worth \$4,232,325,442 to \$3,385,860,354, notwithstanding General Walker's statement (already quoted) that to be a true photograph of the facts the value returned in 1870 should be increased by a sum exceeding \$600,000,000, measured in the currency of the day. It is doubtful if the basis of comparison has been improved materially by this arbi-

¹ Eleventh Census, Manufacturing Industries, 1 : 2 and 4.

trary treatment of the figures; for it assumes that the inflated value of the dollar, in 1870, has only to be eliminated in order to make comparable statistics, whereas the fact is that another element of variation remains which forbids exact comparison—the variation in the quantity of product represented by a dollar, due to change in prices. This variation is so great as to make exact comparison impossible, even if the standard itself were fixed and uniform.

In his discussion of the manufacturing statistics of 1870 General Walker stated¹ that “after much thought and extensive inquiry on the subject, and the application of numerous tests, he was disposed to regard 56 per cent as a just statement of the increase in price for all classes of mechanical and manufacturing productions between 1860 and 1870; that is, that manufactured articles of the same quality (averaging all branches of production) which would have been worth \$1,000,000,000 in 1860 would have been worth \$1,560,000,000 in 1870. This would leave the increase of manufacturing production in the ten years to be represented by 52 per cent.”

In other words, in the census of 1870, which showed an increase of 108 per cent over 1860, 52 per cent, according to General Walker's calculations, represented the increase in manufacturing production, or “the actual industrial growth,” and 56 per cent represented the increase due to increased prices, caused partly by an inflated currency.

Thus we have General Walker, in order to get a reasonable basis of comparison for quantities with the census of 1860, suggesting the reduction of the value of the product of 1870 by 56 per cent of the value of the product of 1860 and Colonel Wright reduc-

¹ Ninth Census, Industry and Wealth, 379.

ing it by 20.19 per cent (the average premium on gold for the census year) for purposes of comparison with subsequent censuses. These two very different treatments of the same results, for the purpose of rectifying variations in the unit of measurement due to different causes, indicate how impossible it is for the lay reader of census figures to make a satisfactory use of them for comparative purposes.

Since 1870 the tendency of prices has been steadily downward, but no subsequent census has taken cognizance of this reversal of the conditions which General Walker attempted to measure in the census of the former year. The striking phenomenon of manufacturing has been the constantly increasing quantity of goods represented by a dollar, due to the cheapening of production brought about by improved machinery and processes, cheaper transportation, and the lower prices of materials.

Professor Falkner's report on prices, for the Aldrich Investigation of 1891, shows that, between 1860 and 1890, there was a greater decrease in the prices of manufactured articles than in any other group of necessities considered, the average fall in the price of clothing being nearly 25 per cent,¹ while in a great variety of staple manufactured articles it was very much more, as, for instance, print cloths, with a decrease of 42 per cent; nails, 41 per cent; hand saws, 62.5 per cent; scythes, 40 per cent; pocket knives, 47 per cent; and so on. It might be possible to establish a statistical barometer of values, for certain lines of staple manufactures, on the plan of Sauerbeck's index numbers, whereby it would

¹ Senate Report on Wholesale Prices, (1893), 1: 83. See also the table of averages on page 91, where it is shown that the fall in the prices of groups of manufactured articles has been uniformly greater than in the food products of agriculture.

be possible to measure this difference with sufficient accuracy for practical purposes. No such collateral work could be attempted, except in connection with a permanent census office. Continuity of method in this respect as in a great many other directions, is impossible, where the whole organization of the census office is periodically broken up.

In the separate industries the difficulties growing out of the lack of a uniform standard of measurement are overcome, to a degree, by the existence of other standards, such as the unit of machinery capacity, as the spindle in cotton, the card in woollens, the loom in silks, etc. But even here the trouble is not overcome; for the spindle, the card, and the loom have been very different things, at each census, in the volume of production they stand for.

Nor are we much better off when, in the separate industries, we undertake to measure growth by actual quantities of given products. The difficulties of supplementing the money value of product by quantities; in special industries, are enormous, because of the constant variations which occur in the characteristics of these products. A yard of cloth is always a yard of cloth; but by no means is it always the same yard of cloth, or a yard that can safely be assumed to be the same, even for statistical purposes.

It is clear that an absolute unit of measurement, in manufacturing statistics, is impossible; and that the accepted unit, the dollar, represents at each census a different thing, both as to capital, product, and wages. There have been no two censuses at which the dollar represented the same quantity of goods, or, in the matter of wages, the same purchasing power. This fact emphasizes the warning of General Walker, that "the

conditions of the census material (in manufacturing statistics) do not allow of nice treatment, and it would be affectation to attempt fine distinction or precise computations in dealing with the subject.”¹ That warning we are in constant danger of forgetting in our modern treatment of these statistics.

III. FACTORY PRODUCT AND TRADES PRODUCT.

A second difficulty is not less troublesome. What *is* manufacturing, and what are properly included in these statistics as manufacturing establishments? The same rule has applied in no two censuses; and the text of all of them is largely occupied in pointing out the things included in one and omitted in another. For instance, the censuses of 1850 and 1860 professed to contain a return of the “Product of Manufacturing, Mining, and the Mechanic Arts;” and they included the gold dug from the California mines. The census of 1870 included the value of stone, slate, and marble quarried, and also the value of the fisheries, excluded from subsequent censuses. The census of 1840 even included “houses” among the products of manufacturing industry; and it is by no means certain that they do not belong there. Mr. Steuart, chief of the division of Manufactures in the census of 1890, states that “certain industries, such as dressmaking, bottling, millinery, cars, and general shop construction, and repairs by steam railroads, manufacture of gas, etc., had apparently been included in the total of 1870, but in 1880 they had either been omitted, or the reports classified with other industries in such a manner that it was impossible to identify them.”² They were all again included in 1890, with numerous

¹ Ninth Census, *Idem*, 375.

² American Journal of Sociology, 3 : 623 (1898).

other industries not previously enumerated in any census.

This constant variation in the rule of inclusion again illustrates the impossibility of satisfactory results, in the absence of a permanent census office controlled by some tradition which insures uniformity of method. It illustrates quite as forcibly the inherent difficulty of satisfactorily determining what is properly to be included in manufacture and properly returnable as such, under the indefinite language of the census law.

Since the founding of the government, the conditions of manufacture have been undergoing profound modification. It has passed rapidly from a household industry into a factory industry, and this latter has divided up into innumerable special industries. The first industrial census was almost wholly an account of household industries, or of semi-household industries,—such as the local carding and fulling mill which simply prepared the wool or finished the cloth spun and woven by the neighborhood families. Our word “manufacture,” in scornful disregard of etymological nicety, has come to signify, in its popular use, something precisely the reverse of that which it chiefly signified when the first industrial census was taken. As we have progressed towards the factory, one after another of the old hand industries was eliminated from the manufacturing statistics, now because it had disappeared altogether, and now because it was carried on by single individuals. The arbitrary rule of requiring a product to be valued at \$500 or more, to be included in the counts, was adopted in 1840. It is practically the only rule of discrimination to which the Census Office has strictly adhered. A more absurd rule could not have been devised.

The truth is that the manufacturing statistics, as now made up, are neither one thing nor another, neither flesh, fowl, nor good red herring. The time has come to draw a sharp line between the hand trades, properly so called, like brick-laying, house-painting, etc., and those productive industries whose products seek the general markets, and are subject to the general laws of trade.

It is impossible fully to cover the hand trades in an industrial census; the existence of the \$500 rule is a confession of that fact. Moreover many handicraftsmen carry on business without any shop or paraphernalia which can be identified or enumerated as a manufacturing establishment. It would seem to be plain that industrialism pursued under such conditions ought not to be confused, for census purposes, with factory manufacture, and that the two classes of data cannot be mingled and combined, in the consolidation of manufacturing statistics, without affecting the exactness of the results.

There were returns from 355,415 establishments in the census of 1890. More than one-third of this number were establishments engaged in the occupations following:¹

Bakeries	10,484
Bicycle repairing	83
Blacksmithing	28,000
Boots and shoes (custom and repairing)	20,803
Carpentering	16,917
Clothing (custom and repairing)	13,591
Dentistry	3,214
Dressmaking	19,587
Masonry	5,969
Millinery shops	6,000
Painting and paper hanging	10,043
Plastering and stucco work	1,746
Total	136,437

¹ Eleventh Census, Manufacturing Industries, I; 36-45.

These establishments cover a form of industrialism which is not manufacturing, in the modern significance of the word. They are collected at an enormous expense, and their verification and tabulation enormously increase the cost and labor of the division of manufactures in the Census Office.

The conditions surrounding handicraft industry are so essentially different from those of the factory that the consolidation into one mass of the data relating to both must materially detract from the scientific accuracy of the results. Trades and manufactures are the same thing in census statistics; although political economy long since differentiated them as distinct and essentially different things.

The conditions of the so-called manufacturing establishments thus grouped indiscriminately together are so obviously different that any attempt to generalize from the data secured is dangerous and unsatisfactory.

Manufacturing must necessarily be treated as comprising the industries carried on under the factory system, which means something entirely different from household industry, from shopwork, from employment at a trade, even when the trade workmen are employed at wages by large contractors. These latter it is impossible ever to cover adequately in a manufacturing census and therefore it is useless to attempt to cover them at all.

On the other hand, by confining the census to what is distinctly recognized as factory production, we should have one complete and homogeneous thing, and could better conform its statistical presentation to scientific methods.

Some doubt exists as to just what factory manufacture is. It would be necessary to make an arbitrary defini-

tion ; but no definition could be more arbitrary than the time-honored one which omits every industry whose product is under \$500, and includes every industry whose product is \$550. I suggest, as a rule which might be followed, a modification of that commonly found in the state labor laws, for the guidance of factory inspectors ; *i. e.*, any establishment in which five or more persons are employed at wages, and in which power is used for the production of articles for sale.

General Walker in an article in 1869,¹ said that the contribution to the wealth of the country by its artisans, or hand-workers, is far more valuable than that made by its factory workers ; and he added that the contribution to the national wealth made by these hand trades ought to be separately reported and carefully differentiated from the report of factory industry. He suggested the desirability of two distinct schedules—a suggestion which he did not attempt to carry out in either of the censuses whose taking he subsequently superintended. Those who had the practical administration of this bureau of the eleventh census inform me that his further suggestion, made in the Ninth Census, and quoted in the foot-note,² for a statistical estimate of the products

¹ *Atlantic Monthly*, 24 : 691.

² "Of the total amount paid for the collection of the Statistics of Manufacture in 'Schedule 4,' more than a fifth was expended for returns relating to carpentering, blacksmithing, coopering, painting, plastering, and plumbing, not one of which industries, though far better returned than ever before, was reported with sufficient completeness even to furnish the data for a computation of the true production of the trade, so that, after this expenditure, one is still obliged to resort to the Table of Occupations for the material from which to estimate the production of this group of industries. The money thus thrown away would have served, if placed under the control of the Department of the Interior for the salaries of experts and for traveling expenses of special agents, to make the statistics of the larger industries complete and correct in the highest attainable de-

of the trades, based upon the Tables of Occupations, is impracticable, for the reason that the larger portion, according to the returns, of those who describe themselves as "carpenters," "blacksmiths," etc., are actually employed in factories and mills, where their work is of the general nature described, while still others may not be employed at all at their chief occupation when the census is taken. It is unfortunately the fact that the statistics of manufactures, when studied in connection with the tables of occupations, present anomalies and inconsistencies which it is not easy to reconcile with our own conception of the facts. For instance, the manufacturing statistics of 1890 report 140,021 persons employed in carpenter shops, while the occupation tables show 611,482 carpenters in the country. In other words, only 23 per cent of the carpenters are returned as such in the

gree, creditable to the census as a national work, and invaluable to the statesman, the political economist, and the practical man of business. At the same time, a well-trained statistician can, in a few hours, from the Tables of Occupations, reach a far more satisfactory result in respect to the products of the minor trades than is to be obtained by manipulating the partial returns of the trades themselves. In a word, the returns of manufactures should be restricted to those industries which are carried on in considerable establishments, and are susceptible to a thorough, complete, and detailed enumeration.

Second. The returns of manufactures, having been thus restricted, should be far more specific, and should be made to conform to the advance in the practical arts within the last twenty years, and to the requirements of modern statistical science. The additional facts thus to be elicited should not be industrial merely, but such also as are of social and sanitary importance.

The manufacturing tables of the census ought to be so full of technical information as to become the handbook of manufacturers, while, at the same time, they might be made so pregnant with truths important to the economist and the statesman as to become a handbook of social and political philosophy. With no more authority of law than might have been contained in five lines of the statutes, and with not a dollar of expense above what has been incurred in making this unsatisfactory exhibit of the national industries, such an enumeration of the manufactures of the country might have been effected at the ninth census."—Ninth Census, *Wealth and Industry*, 384,f.

manufacturing statistics, the remainder not being returned at all, or being lost in the general statistics of car-shops, furniture factories, and other wood-working establishments. It is difficult to believe that 77 per cent of the carpenters of the country are employed in shops other than carpenter shops. It is difficult to believe that 74 per cent of the painters are employed in other than paint shops ; and yet we are forced to this conclusion by the statistics as they appear, and there is no method by which the two groups of carpenters or painters can be segregated and the statistics tested.

IV. GROSS, "NET," AND ACTUAL VALUES.

A third difficulty encountered in manufacturing statistics has to do partly with methods and partly with phraseology.

As our censuses have hitherto been taken, they involve an enormous element of duplication and reduplication in the products, a defect which has been regarded as unavoidable, and which results, notwithstanding the constant warnings of the text, in an almost universal misconception of the real facts. The finished products of one branch of industry being constantly the raw materials of another in the ascending scale of modern industry, it follows that they are counted over and over again in swelling the final value of products. Thus in the wool manufacture, the product of the yarn mill is the raw material of the cloth mill, and the product of the cloth mill is the raw material of the clothing manufacturer ; by the time the aggregate is made, the value of the yarn has been counted three times and the cloth twice. This is a fair sample of what goes on everywhere, from beginning to end of these industrial statis-

tics. A product the value of which has been stuffed and restuffed in this manner is a fictitious total ; and all percentages reckoned thereon, in relation with any other items returned, are necessarily a snare and a delusion.

A curious illustration of the effect of this duplication, and of the difficulties it presents, is found in the case of gray cloths sent to finishing-mills to be bleached, dyed, or printed. Here the final processes are so slight, in comparison with the value of the material operated upon, that the censuses of 1860, 1880, and 1890 omitted the latter from the report of the value of product. In 1870, however, General Walker included this value, justifying himself by this reasoning : ¹

“ Allowance must also be made for the different treatment of one other industry, viz., cloth-printing, in the present publication, from that adopted at the eighth census. At 1860 the value of the cloth printed would appear not to have been embraced, either in the value of materials or in the value of product ; but in the former only the value of mill-supplies, coloring matter, etc., and in the latter the value added to the goods by printing. At the present census it has been thought best to include the value of the cloth in the statement both of materials and of product. By this means the net value created by the industry is as closely obtained as by the other method, while just so much additional information is given. Indeed, there seems to be no reason for making this one industry an exception to the entire list of kindred industries in this particular. The fact that the value of materials here becomes unusually great, as compared with the value to be added by the processes of printing, certainly constitutes no difference in principle as between this industry and any other. If

¹ *Idem*, 378.

the subject matter of the industrial process is to be included in the account when it amounts to three-fourths of the value of the ultimate product, there seems to be no good reason for excluding it because it reaches five-sixths of that value."

The reasoning is absolutely sound ; but the result of its application in this particular case is so absurd that General Walker himself, in 1880, again excluded the value of the goods operated upon from the gross value of the product of the finishing-mills, as was done in 1890. But the duplication in this instance differs only in degree from that which prevails everywhere ; and the case admirably illustrates the crudeness of the whole treatment of this problem of the manufacturing statistics.

The text of the Eleventh Census, recognizing the fact that the total value of products reported, \$9,372,437,283, is a fictitious total, takes a step towards an approximation of the true total, by deducting from the above figure the whole sum, \$5,162,044,076, reported as the sum expended for the raw materials employed in creating it, leaving a residuum of \$4,210,393,207, which it describes as the "net value of product."¹ In this procedure, it follows the example set by General Walker in the ninth census and again in the tenth. It is an unscientific method of dealing with the difficulty, and unsatisfactory both in phraseology and in result.

The net value of anything is that value which remains after deducting whatever may properly be charged against it. In this case the census has deducted a great deal more than can properly be taken away, and instead of securing a "net" product, it has obtained a sum which is not the true value of our manufactured products, but simply *the value added to crude materials by*

¹ Eleventh Census, Manufacturing Industries, 1 : 28, f.

the manufacturing process. The true "net value" of products is not the gross value, nor is it the added value obtained by deducting the cost of materials; but it is that added value, plus the sum originally paid for all the raw materials used, in the crude form in which they first appear in any factory.¹

I conceive it possible so to take a manufacturing census that this difficulty of duplication will be eliminated, and a basis thus obtained for accurate percentages. It could be done by providing on the schedules two columns for the entry of the value of raw materials consumed: one column for all raw materials consumed in the absolutely crude form; the other for the raw materials purchased and consumed, which have been advanced by any process of manufacture sufficiently to insure their return in some other branch of industry. Raw wool or cotton would all be reported in column 1; yarns, dyestuffs, gray cloths for converting, etc., in column 2. The net product of industry, in any branch of manufacturing, would then be secured by subtracting from the gross value of products the total value of the materials reported in the second column. The result

¹ This method of the census leads to some curious conclusions. For instance, in Kansas the slaughtering and meat packing business constitutes 40 per cent of the gross value of the products of the state, (*Idem*, 416-421), and in this industry the cost of materials is very large, in comparison with the labor cost. The phrase adopted by the census reduces us to the absurdity of saying that the "net" value of the product of the meat-slaughtering business is the bare cost of killing and packing the cattle, *i. e.*, \$8,560,000, whereas the materials upon which this sum was expended cost \$38,031,824. In the manufacture of coffee, spices, etc. (*i. e.*, their roasting, grinding, and preparation for market), the cost of the materials as returned to the eleventh census, was \$65,961,465, and the value of the product was \$75,042,010, (*Idem*, 75), so that the "net value," as thus ascertained, was only \$9,080,545. In the lard industry the "net" value of the product is reduced to \$2,820,488, although the cost of materials was \$12,654,360, (*Idem*, 79).

would be the apparent value, at the factories, of the products of the factories. There would be no duplications; and yet the value of all crude materials consumed would be represented in the resulting total, as it should be. We should then know the value of the factory manufactured products of the country, so far as it can be measured by means of a manufacturing schedule—something that we have never yet even approximately learned from the Federal census.¹

V. DEFECTIVE ANALYSIS AND MISLEADING PERCENTAGES.

We may fairly criticise the use made by the Census Office of statistics thus avowedly defective.

The text of the Eleventh Census contains an analysis showing the average value of product per employee in each of the industries, calculated both on the "gross" product and the "net" product, so called. For the former it is given as \$2,204; for the latter as \$999 per capita;² and both figures are wrong, and necessarily wrong, for the reasons just stated. The tables referred to³ should never have been compiled or printed; for the elements entering into the average thus obtained are so variable, and the conditions governing industry in each of its branches are so wholly different, that they not only possess no statistical value, but invite misconception and false deduction. The only thing that can be

¹ The limitation upon this plan is its failure to account anywhere for the value of semi-manufactured raw materials, which may have been imported. The quantity of such is not large enough to vitiate the returns; it would always be an error on the safe side; and it might be closely estimated from the import returns made by the Treasury Bureau of Statistics.

² *Idem*, 37.

³ *Idem*, 34-45.

said in their favor is that as computations they are mathematically correct.

Criticism equally harsh lies against other statistical presentations or mathematical manipulations of the manufacturing statistics of the eleventh census.

One table presents "average capital required and cost for a product valued at \$100, by states and territories,"¹ and another similar table shows the same thing by specified industries.² These tables indicate that in the year 1890 the average cost of every \$100 of manufactured product was \$86.17. They are accompanied by a footnote explaining that the difference between cost and value (\$13.83) does not show the true average profit or earnings of capital, because the cost reported does not make any allowance for "depreciation of plant or mercantile risks." It is therefore not the cost. So long as it does not show either the profit or the cost of manufacture, we must wonder why the table was made, since if it does not show one or both, or approximately show them, it shows nothing at all. In this particular instance, an additional vitiating feature of the figures is the duplication to which we have referred, of which the Census Office here has made no account, and which renders this entire series of calculations an instance of the official dissemination of false information.

All attempts to present, from census returns of manufactures, percentages of relationship between the several items reported (and they frequently appear in state censuses) are scientifically wrong; and a conspicuous illustration of the abuse to which official statistics are subjected. The percentages of "labor cost," the percentages of "labor's share in the manufactured

¹ *Idem*, 48.

² *Idem*, 49-53.

product," the percentages of "capital's profit," etc., which are frequently worked out from these statistics are not simply meaningless; they are, in the nature of things, deceptive and misleading.

In the first place, they are based upon averages, and these averages are in turn based upon conditions so absolutely dissimilar that their combination results in a statistical picture like that of the kaleidoscope. The colored glasses in the kaleidoscope always fall together in some symmetrical pattern; but it is always a pattern which has no relationship to anything whatever. The man who is working with silk as his raw material, worth a dollar a pound, will be shown to secure in wages a very small percentage of the total value of product. Another man who works in shoddy worth ten cents a pound will be shown to secure a very large percentage of that value. The wages of the two, let us say, are the same. What, then, does the percentage show? Why is it calculated? What statistical or sociological value has it? Shake the two together and strike an average percentage: the result is more worthless than before.

In the text of the ninth census General Walker presented an admirable demonstration of the futility of these vicious percentages.¹ He grouped the manufacturing, mechanical, and mining industries of the country into five groups, arranged in accordance with the manner in which the character of the subject-matter of labor affects the relations of wages to product. These five groups range from those in which the materials, so called, are intrinsically of no value until operated upon by labor, like the products of mining and other extractive industries, up to those in which, as in diamond-cut-

¹ Ninth Census, *Wealth and Industry*, 379,f.

ting, the value of the materials employed far exceeds the value of all other elements in the cost of production and thus carries the value of the product in these industries to a very high point, although comparatively little has been added to the original value.

Commenting on his table, General Walker says: "The first class of industries, with a reported gross product of \$143,000,000, is shown to yield a net product only \$5,000,000 less than that of the fifth class, which has a gross product of \$841,000,000, while the wages paid in the first class exceed those paid in the fifth by 131 per cent. Nothing, perhaps, could set in a stronger light the necessity of considering all statements of manufacturing production *in connection with the value of materials consumed and the cost of labor*. Here are two groups of industries, the one reaching the gigantic total of \$841,000,000, the other aggregating but one-sixth as much; yet the latter makes a clear addition to the wealth of the country equal to 96 per cent of the net production of the former, and actually pays more than twice as much in wages."

For the five groups his table, a part of which is here reproduced, shows the following curious and instructive results:

RELATION OF WAGES AND MATERIALS TO PRODUCT IN MANUFACTURING AND MECHANICAL INDUSTRIES.

CLASS.	Dollars of Wages in \$100 of Product.	Dollars of Materials in \$100 of Product.	Dollars of Wages and Materials in \$100 of Product.	Product per capita, gross.	Product per capita, deducting Materials.
I-----	\$51 30	\$10 07	\$61 37	\$ 843 51	\$ 758 54
II-----	23 07	43 86	66 93	1,400 00	785 87
III-----	31 20	34 28	65 48	1,376 84	904 92
IV-----	20 29	56 62	76 91	1,859 10	806 51
V-----	3 77	84 10	87 87	8,285 44	1,316 64
Aver'ge of all	\$19 40	\$57 19	\$76 59	\$1,967 80	\$842 32

In reference to this part of the table he says: "It appears that the value of the materials consumed in the several groups of industries ranges from \$10.07 to \$84.10 in each \$100 of product; that the amount of wages ranges (going, so to speak, in the opposite direction) from \$51.30 to \$3.77 in each \$100 of product, while the gross product per capita ranges from \$843.51 to \$8,285.44, and the net product ranges from \$758.54 to \$1,316.64. The reason for these astonishing differences is not found chiefly in any difference in the quality of labor, or in the more extensive application of machinery in one class than in another, but almost wholly in the treatment of this subject of the materials consumed in the successive industries and classes of industries."

It is superfluous to add to such a statistical demonstration of the fact, that any calculation of relationship of wages to product, or employee to product, based upon a combination of the statistics of many industries so fundamentally different in the conditions surrounding them, will tell a story that is without statistical significance. The difficulty is inherent. Things which are different from each other cannot properly be combined for such purposes. Adding together all these figures returned from all these unrelated industries for the purpose of figuring percentages on the averages, is not essentially different from adding together bushels, pounds and yards, and striking an average of the whole. And yet it is done, and regularly done, in both national and state censuses.

VI. CAPITAL IN MANUFACTURING.

Other features of a manufacturing census are equally perplexing; most perplexing of all, perhaps, is the item of capital. The amount of capital invested in manu-

facturing has been called for in every Federal census of manufactures. The worthlessness of the return has been manifest in all of them, but Congress still insists that it shall form one of the elements of the return. J. D. B. DeBow, the superintendent of the seventh census, gravely reported that the returns of capital and product showed a return of 43 per cent upon the whole investment, and he added that "the ratio of profits in the several States is also given, presenting some anomalies which cannot at present be reconciled. Those who will examine the manufacturing returns of 1840 and 1820 will find still greater ones."¹ That was a naïve superintendent who consoled himself for the promulgation of a statistical absurdity by calling attention to the fact that his predecessors had perpetrated even greater monstrosities in the way of official figures! Examining Mr. DeBow's "anomalies," we find him showing, in Missouri, a profit of 89 per cent, in Kentucky of 62 per cent, in Texas of 83 per cent, in Illinois of 79 per cent, and in Utah a loss of 116 per cent! Those must indeed have been halcyon days for manufacturers—everywhere but in the land of Mormonism!

General Walker was the first to point out the uselessness of the attempt to return capital invested, and he did it with his customary fearlessness, both in 1870 and 1880. In the former census he said:²

The census returns of capital invested in manufactures are entirely untrustworthy and delusive. The inquiry is one of which it is not too much to say that it ought never to be embraced in the schedules of the census; not merely for the reason that the results are, and must remain, wholly worthless, the inquiry occupying upon the schedules the place of some technical question which might be made to yield information of great value, but also because the inquiry in respect to capital creates more prejudice and arouses more opposition to the pro-

¹ Seventh Census, Compendium, 179.

² Ninth Census, Wealth and Industry, 381, f.

gress of the enumeration than all the other inquiries of the manufacturing schedule united. It is, in fact, the one question which manufacturers resent as needlessly obtrusive, while, at the same time, it is perhaps the one question in respect to their business which manufacturers, certainly the majority of them, could not answer to their own satisfaction, even if disposed. No man in business knows what he is worth, far less can say what portion of his estate is to be treated as capital. With respect, indeed, to corporations having a determinate capital stock, the difficulty of making a correct return in this particular becomes very much reduced; yet even here the difference caused by returning such capital stock at its nominal value on the one hand, or at its actual selling-price on the other, whether above or below par, might easily make a difference of 50 or 75 per cent in the aggregate amount of capital stated for any branch of industry.

Where, however, business is carried on outside of incorporated companies, the difficulty of obtaining even an approximate return of capital, resulting from the nature of the inquiry itself, irrespective of the reluctance of manufacturers, becomes such as to render success hopeless. So numerous are the constructions possible and even reasonable in respect to what constitutes manufacturing capital, that anything like harmony or consistency of treatment is not to be expected of a large body of officials pursuing their work independently of each other. The Superintendent is free to confess that he would be puzzled to furnish a definition (fit for practical use by enumerators) of manufacturing capital, or, even in a single case, with complete access to the books of a manufacturing establishment conducted by two or more partners, and with the frankest exhibit of the assets, both of the firm and of the individuals thereof, to make up a statement of the capital of the concern, in respect to which he would feel any assurance. When to such difficulties in the nature of the subject is added the reluctance of manufacturers to answer an inquiry of this character, it may fairly be assumed, in advance of any enumerations, that the results will be of the slightest possible value.

It is greatly to be regretted that the census should be encumbered by an inquiry yielding so little; yet provoking so much opposition to the progress of the general work.

The aggregate amount of capital invested in manufactures in the United States, as by the following tables, is \$2,118,208,769. It is doubtful whether this sum represents one-fourth of the capital actually contributing to the annual gross product of \$4,232,325,442.

It is a pity, and may almost be said to be a shame, that statistical information, in many respects of high authority and accuracy, should be discredited by association with statements so flagrantly false, even to the least critical eye; yet, as the manufacturing schedule annexed to the act of 1850 requires this return, and as there is a vague popular notion that the statement of capital in this connection is of real and great importance (instead of being, as it is, at the best, of the least

consequence), the Superintendent does not feel at liberty to withhold the results from publication ; but he feels not only authorized, but required, by the facts of the case to brand them as he has here done, in order that no one may be deceived by the show of authority they present.

Returning to the question in 1880, after ten years of reflection and another attempt to accomplish the impossible, General Walker repeated these conclusions with equal emphasis and supported by additional arguments.¹

Superintendent Porter, required by law to secure a return of capital in 1890, made an anxious effort to find a method that would avoid these scathing criticisms. He held consultations with business men, and the form of inquiry finally adopted was based upon their judgment, as supplying a drag net by which all forms of capital, directly or indirectly employed in manufactures, could be reached, although I believe it was their judgment that even in this form the return would be statistically worthless.

The Massachusetts state census has subsequently adopted a modification of the Federal schedule of 1890, and in order that the reader may have before him the whole present status of this capital question, I append the two schedules in the form of a footnote.² (See page 287.)

Here are discrepancies of a radical character, which prove that, with all the thought bestowed upon this question, there still exists among experts the gravest difference of opinion as to what constitutes capital actually invested in manufacturing.

Indeed, those who have attempted to meet General Walker's criticism, by formulating schedules to include credit capital with that actually and permanently invested in manufacturing, have had no clear conception

¹ Tenth Census, 2 : xxxix.

of the intricacies of the problem. They have never attempted a restrictive definition of what constitutes capital for purposes of statistical measurement.

The Federal census schedule of 1890 is founded upon the theory that the gross assets of a manufacturing concern constitute its capital invested, and can properly be treated as such, in combination with the gross assets of all other manufacturing concerns. The gross assets of a business consist of everything it possesses available for the payment of its debts, and into them enters to a greater or less degree the credit of the establishment which has been used in accumulating these assets. The extent to which a manufacturer utilizes his credit varies from day to day and month to month, often by very

² QUESTIONS REGARDING CAPITAL IN MANUFACTURES.

U. S. ELEVENTH CENSUS.	MASS. CENSUS, 1895.	
CAPITAL INVESTED (BOTH OWNED AND BORROWED.)	CAPITAL INVESTED.	
	CLASSIFICATION.	33. AMOUNT.
Value of plant (the value should be estimated at what the works would cost in 1890, if then to be erected, with such allowance for depreciation as may be suitable in the individual case.)		
Land \$	25. Land.	\$
Buildings \$	26. Buildings and Fixtures.	\$
Machinery, tools, and implements \$	27. Machinery and Motive Power.	\$
Total		
Live capital:	28. Implements and Tools.	\$
Raw materials on hand . \$	29. Cash.	\$
Stock in process, and finished products on hand (estimate value of finished products on hand at their present selling value) \$	30. Credit Capital.	\$
Cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of foregoing items \$	31. Stock on hand (raw and in process of manufacture.)	\$
Total	32. Total Capital Invested.	\$

large amounts. It is clear that his credit and his capital are two distinct things, fundamentally different in their relations to the conduct of his business, although they discharge the same functions. The borrowing capacity of a concern is not the sum which it actually borrows in its business, but the sum which it might borrow if business exigencies required. Credit is an intangible, elusive, elastic thing, indefinitely expansive, and subject to sudden contraction under financial panic. Capital is a tangible thing, which can be measured by fixed units. In combining the two under one head, the census has opened its returns to a criticism very different from that made by General Walker, but, from the point of view of scientific statistics, equally fatal.

The part which credit plays in carrying on the productive industries of the country is enormous and indispensable, but it is not a part that is susceptible of statistical measurement. A given sum of money often stands for transactions which aggregate three or four times its amount. These instruments of exchange rest primarily upon credit or confidence, and permit a volume of business enormously greater than would be possible if an actual dollar had to be exchanged for every transaction which represents a dollar.

The Federal census, by calling gross assets capital, harnesses up credit with capital, and thus commits itself to the statistical measurement of a thing which has no existence outside the confidence which business men have in each other. The pretended capital which has been created by these instruments of exchange has no existence whatever; at the end of the operation there is merely the original capital restored, increased according to circumstances by the profits which its use in operation may have produced and which have been divided

between debtor and creditor. Credit thus multiplies the producing and consuming power of society by facilitating exchange; it accelerates and thus increases this power, but it does not increase the actual capital of the country, or the actual capital employed in manufacturing.

Let us see how it operates in a concrete case. One mill reports, as its gross assets or capital, everything it has in the shape of plant, stock, product, cash, bills receivable, etc. Included in the latter will be the notes of another mill given in payment for \$100,000 worth of print cloths. In the statement of the other mill will appear \$100,000 worth of print cloths for which those notes have been given; the census gets \$200,000, only half of which is actual capital, the other half being credit. Let us suppose that the second mill has an opportunity to sell these print cloths to a third mill at a profit, receiving in exchange therefor the latter's notes. The reports of the three mills will then show in the census a fictitious total of \$300,000, plus two profits, which sum, when the transactions are finally completed, will resolve itself back into \$100,000 plus the profits. The census return presumes that two distinct amounts of \$100,000 each have been created, both of which disappear when the time of the maturity of the notes arrives. Inasmuch as the unsettled transactions between mills in related industries are at all times enormous, it is easy to conceive that the amount of duplication represented in the total capital reported must be frightful.

Independently of whether the resulting total is too large or too small to fit the inherent probabilities of the case, it is clear that the result is a purely arbitrary

figure, bearing no fixed relationship to any other return on the manufacturing schedule, and an attempt to measure in figures something which, so far as we can now see, is not susceptible of statistical measurement.

The Massachusetts state census of 1895 rejects the theory that gross assets constitute manufacturing capital, and attempts to limit its return to capital actually devoted to production. It includes, in capital invested, the value of raw materials on hand and of goods in process of manufacture; but it excludes three items covered by the Federal census of 1890; viz., (*a*) finished products on hand, (*b*) bills receivable, and (*c*) ledger accounts. It makes this explanation:¹

Undoubtedly these items should be included, if it is desired to know the *assets* of the establishments; but it seems equally clear that none of them should be included, if the aggregate is to show only *the capital devoted to production*. The item "goods on hand" is product, not capital. It is an asset, of course, but by so much as capital is increased by including it, the deductions which follow in the census report as to "Amount of capital required to a product value of \$100," and especially deductions as to the relation of profit to capital, sure to be made, are invalidated.

This statement is astonishing for its tacit admission that deductions "sure to be made" from the census statistics, as to the relation of profit to capital, are permissible and possible. Inasmuch as no scheme is conceivable whereby it is possible to approximate a statement of the profits of manufacturing, since the element of sales, or prices obtained, is eliminated from the account,—the "value at the factory" being the only value ever taken, and since every census disclaims with all possible emphasis any attempt to measure profits, we are at a loss to understand why the Massachusetts census should hint at the possibility or propriety of such deductions under its scheme of reporting capital.

¹ Massachusetts Census of 1895, 5 : 222.

It is astonishing again in its suggestion that capital is not actually employed in manufacturing, unless its employment has to do directly with the productive processes. Whatever may be the amount of money locked up in goods on hand, that sum is just as much a part of the money required for and employed in carrying on the manufacturing business as though it were tied up in machinery and plant. Nor is it duplicated in any of the other items under which capital is reported.

As a result of these eliminations, we get in the Massachusetts census of 1895, a total investment stated at \$516,082,557, required to produce a product valued at \$849,807,302.¹ Comparing these returns with those of the Massachusetts census of 1885, in which the first attempt to include credit capital in a census was made, and with the Federal census of 1890, we have the following comparative results for that state :

	Capital.	Product.	Product per \$1,000 of Capital.
Mass. Census, 1885 ² ----	\$500,594,377	\$674,634,269	\$1,347.66
Federal Census, 1890 ³ ---	630,032,341	888,160,403	1,409.70
Mass. Census, 1895.-----	516,082,557	849,807,302	1,646.65

Thus we find that the three consecutive attempts which have been made to secure what is called a "complete" return of the capital invested in manufacturing in Massachusetts are so totally out of joint with each other as to discredit all of them. Without any means of ascertaining which is right, as establishing a true ratio between product and capital, the investigator must conclude that all are wrong and worthless. The one thing we do know about the matter is directly contrary to the inference of these figures ; we know that the product per \$1,000 of capital employed,

¹ *Idem*, 223 and 228.

² Mass. Census of 1885, 2 : lxxxv and xciii.

³ Eleventh Census, Manufacturing Industries, 1 : 68.

when measured by value, instead of increasing as indicated by these figures, has shown a steady tendency to decrease. It would seem that this is a matter of such vital importance, in its relation to the economic situation of industry, as to forbid the government, whether national or state, to trifle with it in this manner.

The worthlessness of the eleventh census returns of capital is again demonstrated by the following table, showing the capital reported to each \$100 of product in the several branches of textile industry.¹

Woolen, including hosiery and knit goods.....	\$ 87.7
Cotton.....	132.1
Silk	58.4
Dyeing and Finishing.....	133.1

That no such discrepancy as this exists, or can by any possibility exist, in the financial resources required to carry on these several industries, is patent.

But the difficulty is not alone with the live capital, so called, whether the same be owned or borrowed; it is equally difficult to deal properly with what is called *fixed capital*, or *plant*.

The census schedule of 1890 directed that "the value of the plant should be estimated at the probable cost of the works if erected in 1890, with such allowance for depreciation as may be suitable in each individual case."² Now, it is obvious that this is not a call for the capital invested in the plant, but for the *present market value* of the plant, as estimated by its owner, which is a very different thing, and a thing subject to so many varying conditions, dependent on so many contingencies, as to have no definite relation to the amount of capital actually invested. If we were reporting the capital invested in mortgages we would be seeking a definite sum—the

¹ *Idem*, I : 49, ff.

² *Idem*, I : 10.

actual amount advanced upon those mortgages at the time of record. But in seeking the amount invested in manufactures we are seeking, not the amount actually invested, for a large part of it—in fact, the larger part of it—has worn itself out in depreciation, in business failure, or in other ways. When the Census Office undertakes to make a statement in dollars and cents of the present face value of that capital, it attempts an impossible thing. General Walker's language is none too strong in denunciation of it. I am acquainted with dozens of mills where the actual investment of capital has been four or five times the present value placed upon the works by the managers or the assessors. I know a mill that cost \$150,000 and was running until recently, which sold under mortgage foreclosure the other day for \$15,000. There are at all times idle mills throughout the country, which are not taken at all by the census agents because they are idle. Yet they represent invested capital none the less. In 1890 I made a special inquiry regarding idle woolen mills, and found invested in their real estate and plant over \$6,000,000, which is not included in the total capital reported for that industry.

A mill is worth, suppose we admit, what it will bring in the market, and therefore the census in calculating capital should take cognizance only of present market value. But the market value of mill property is contingent: contingent upon location, transport, and power facilities; upon the character and market for the goods it is making; upon the business conditions which prevail at one time and are absent at another; upon the efficiency of the management; upon the value of the patents owned and operated; upon a thousand and one things which cannot be estimated in dollars and cents.

So I say that the capital invested in manufacturing, either as live assets or in real property, is a thing which cannot be calculated in dollars and cents ; in other words, a thing which cannot be statistically measured, and we may well question the propriety of the attempt to measure statistically a thing which eludes all standards of measurement.

The capital represented by buildings and machinery rented for manufacturing purposes is just as much devoted to those purposes as though it were directly invested, instead of being indirectly invested. We may conceive of two identical mills standing side by side devoted to the same product, each worth \$100,000, one of them owned by the company operating it, the other leased—and perhaps leased from a principal stockholder. By the census method of treating the matter one establishment is represented as having a capital \$100,000 greater than the other, to produce the same value of goods. In treating capital the eleventh census has excluded from its general tables the value of hired property, although the amount is given in the text, perhaps because it was necessary to estimate it on the basis of the amounts reported as paid for rent. Thus estimated, the value was \$1,156,225,057, which, added to the “direct investment,” so called, makes an aggregate of \$7,681,381,543, of which hired property constitutes 15.05 per cent.¹ The Massachusetts Census and Annual Reports on Manufactures take no cognizance whatever of the capital invested in hired property. It is impossible to understand on what theory hired property can be excluded from consideration as capital invested in manufactures, when money temporarily borrowed is so included. Illustrations of this character suffice to

¹ *Ibid.*

show how impossible it is to draw conclusions of any value or any accuracy from these returns of capital.

There is nothing so patent as the fact that the capital that has been actually invested in manufacturing in this country is enormously greater than the aggregate reported by the census. Manufacturing capital has a tendency to eat itself up, to a degree unknown in any other branch of enterprise. A well-managed mill completely up to date will charge off 10 per cent per annum for depreciation and improvements made necessary by perfected processes in machinery. If we estimate the average annual loss at 5 per cent it is evident that manufacturing capital must entirely replace itself, either from its own earnings or from outside sources, every twenty years. No two manufacturers, taking cognizance of these conditions, will follow the same method in preparing their reply for a census schedule—not because of a desire to deceive or conceal, but because the whole thing is contingent, and contingencies cannot be statistically measured.

All this being true, what can be the propriety of continuing to gather this particular item in future census returns of manufactures? We have seen that it is an attempt to measure a thing which from its very nature cannot be statistically measured; a thing which can only be compared to the mercury in a thermometer, which expands or contracts according to the conditions of the temperature, and occupies more or less room with each variation. The return of capital for a particular month of the year can be no better test of the matter, in its relations to the whole question, than the register of the thermometer on a particular day is a test of the temperature of the year.

We have seen that all the schemes of the experts to

overcome these difficulties have been futile, and all future schemes must be equally futile, by reason of the inherent nature of the subject-matter.

We have seen that this is the one question which, more than all others combined, increases the difficulties of those who gather, and arouses the antagonism of those who supply, census data.

We have seen that the government, in promulgating these figures, puts the sanction of official authority upon a statistical falsehood.

We have seen that the return of capital is valueless for any statistical purpose, or as an aid in reading into the other figures their true meaning and significance. We have seen, finally, that more than any other figures in the whole group of census statistics, the return of capital is used to propagate false ideas of our social status, and to justify conclusions from industrial statistics which are delusive and harmful. Therefore I agree with General Walker that they might far better be omitted altogether from the census. Their presence taints and invalidates the whole body of manufacturing statistics.

The objections raised to the abandonment of the capital return are, first, that such an exhibit is necessary to a correct portrayal of the wealth of the country and its method of employment; and, second, that unless we have invested capital upon which to figure, the sociological utility of the manufacturing statistics is largely gone, and they cease to be of much practical utility in the elucidation of problems connected with the relations of labor and capital.

The answer to the first objection is that manufactures are the only branch of industry in which this attempt is made. In agriculture, mining, the fisheries, and mercantile occupations no kindred inquiry is made, although

it is quite as possible to secure satisfactory results in any one of these fields. A better way of stating it is to say that it is impossible to secure satisfactory results in either field. Those who demand impossible statistics in the census are like the child crying for the moon.

As to the second objection, it would seem to be obvious that it is better to avoid all statistics from which only false deductions are possible than to furnish a fictitious official foundation for building a sociological superstructure which is wrong. No computation or inference which one may base upon this return, considered in its relation to the other returns of the manufacturing census, has any value, because we can never know that it is even an approximation of the truth. It was a famous saying of General Walker's that one census error has a tendency to offset another, so that the aggregate results are sufficiently near the truth for statistical purposes. But from that statement the statistics of capital invested must always be excepted.

Beneath this second objection, whenever and wherever it is raised, there lurks another. Those who raise it desire the statistics of capital retained, because they believe these statistics furnish some basis whereby the profits of manufacturing can be measured, and we have quoted the statement of the director of the Massachusetts state census to the effect that these figures always will be used for that purpose.

Congress has no constitutional power to exact a census return which shall reveal individual profit or loss in private transactions, and for that reason it has never been attempted. Some of these later presentations of the capital question come dangerously near to attempting it by indirection. It is certain that they furnish a basis upon which amateur statisticians and sociologists think

they can figure a result sufficiently near the truth to warrant them in attempting all sorts of silly calculations concerning the relative shares of labor and capital in the proceeds of their joint endeavor. Every possible deduction of that nature which can be drawn from census statistics is false, and a breeder of mischief. For the government to perpetrate statistics which it knows to be false, and knows will be used for the promulgation of false theories and deductions, is, in the language of General Walker, a pity and a shame; we may almost go a step farther, and call it a crime.

VII. CLASSIFIED WAGE RETURNS.

Having spoken in so critical a spirit of many features of the eleventh census of manufactures, it is a pleasure to turn to another of which it is possible to speak with unreserved commendation. The presentation of wage statistics in the eleventh census is as nearly perfect a piece of statistical work, as it seems possible to render this very perplexing group of data, and far superior to any previous presentation in the census. The classified wage table, upon which its results were obtained and by which they were tabulated, is the outcome of the statistical experience and experiment of many years, many bureaus, and many countries.¹ It permits a photograph of the actual wage status in each of the industries, which presents a faithful picture, such as can be obtained under no system into which the average enters as an element. Since all rates of wages prevail, and prevail in all industries, an average of them all presents a statistical dictum which, for sociological purposes, possesses no more value than a calculation of the average age of the people of a state or a community.

¹ *Idem*, I : 13.

The wage mean of a nation, or of a particular industry, is of service, for comparison with the mean of another country or another industry, provided we can be sure that all the elements composing the comparison are the same. The average wage, including men, women and children, and including them in a varying ratio from census to census, is of very little value, as Colonel Wright has pointed out, "and is often vicious as used." Whether this vicious use made of it, in view of the extreme difficulty of correctly stating all the elements which must enter into a true comparison, is not a sufficient reason for excluding any such calculation from the census is at least an open question. It forms the subject of one of the severest criticisms passed upon the eleventh census of manufactures. That criticism rested upon the fact that the census schedule called for the average number of employees and the *total* amount paid in wages, and secured its average wage by dividing one into the other.¹ That the result was not a perfect average is apparent; for the sum of total wages paid was not paid to the average number employed, but to all who were employed throughout the year. How far the average secured is vitiated by lack of similitude in the parts, it is impossible to say. That the method adopted was the best that can be employed, I entirely agree with Mr. Steuart in asserting. But it remains a question whether the knowledge that the result is faulty in the first place, and of doubtful utility in the second, ought not to exclude such averages from the census altogether.

Mr. Steuart's careful paper does not meet this question. Neither does it satisfactorily explain the fact that

¹ W. M. Steuart, in *Am. Journal of Sociology*, 3 : 627.

by the census of 1890 the average per capita wage of all classes of employees was \$484.49, while for the census of 1880, the same average, based upon returns presumably the same, was only \$346.91. The one thing we do know, without the aid of "official statistics," is that no such increase in average earnings actually occurred between the decades. Hence we know that notwithstanding the popular belief that official figures do not lie, one or both of these averages is wrong. All the circumstances connected with the enumeration and tabulation justify the belief that the error occurred in the tenth census. That it was a clerical error, hidden away somewhere in the multitudinous tabulations, is probable. However it occurred, it is only another illustration of the extreme fallibility of census statistics, and the great danger of predicated convictions upon the outcome of this vast mass of data, brought together from thousands of different sources, by thousands of human agencies, each with his own point of view, and tabulated by a body of clerks to whom the figures mean nothing.

No two manufacturing censuses heretofore taken have been comparable, in the strict sense, and it will be a long time yet before we reach the point when that will be possible. But we need not despair of them on that account. The conditions governing manufacturing industry change so rapidly that they preclude accurate comparison. The changes in classification alone, which are necessitated by the steadily increasing diversification and specialization of industry, throw comparison out of gear everywhere. The constant improvement in census office methods operates in the same way. In view of the fact that no two past censuses are properly comparable, I do not think that any census administration should hesitate to adopt any change of method which involves

obvious improvement in results, simply for the purpose of retaining some semblance of uniformity. Actual uniformity being impossible, every improvement should be made when it can be, with a view to bringing the method to a point approximating perfection as quickly as possible. However, it should again be added that we must despair of that until such time as Congress can be persuaded to establish a permanent Census Office. It is hopeless to expect a satisfactory census, in any branch of the work, so long as the office is broken up and reorganized with each decennial census. A temporary office has no traditions. No appropriation, however lavish, can buy experience in census matters. That which is learned in taking one census is worth a million dollars as a nest-egg for the improvement of the next, and another million as a direct saving in the total cost—a mild estimate of the expense of relearning it. The refusal to make this office permanent is the most striking illustration of the habit Congress has of saving at the spigot and wasting at the bung-hole. Until the knowledge of the errors and mistakes of one census is brought directly to bear, through continuity of service, to guide the taking of the next, we shall continue to have faults in this work, for which no director can be held responsible.

In the meanwhile, this review has shown that no census of manufactures, prior to that of 1880, when the work of enumeration was first taken from the hands of the deputy marshals and turned over to a body of men which, however deficient, was at least homogeneous and amenable to the regulation and discipline of the director, was in any sense an adequate or trustworthy presentation of the industries of the country. The manufacturing census of 1880 was as far superior to the best of its predecessors as language can describe; and that of

1890 was a vast improvement over the tenth. With these consecutive examples of progress before us, we have no need to despair of the ultimate attainment of a manufacturing census free from all genetic criticism.

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